The MAC Flyer

MAY 1982

ANNOUNCING

MAC's new mishap prevention program . . . page 4

The MAC Flyer

MILITARY AIRLIFT COMMAND

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For Greater Safety and Efficiency in MAC Air Operations.

MACRP 127-5 MAY 1982 VOL XX IX NO. 5

page 8

page 21

page 25

Flying Safety Week '82 3
The AWTH Program 4
Red Flag 8
Mishap with a Moral 12
Doc Talk 14
Allied Airlifters 16
You're Not Just a Pilot, You're an Aircraft Commander 18
Real People 21
Excellence in Airmanship 24
C.R. Terror 25
Quick Stoppers 28

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The MAC Director of Safety talks about . . .

FLYING SAFETY WEEK '82

The Air Force Chief of Staff, General Lew Allen, has designated 17-21 May 1982 as USAF Flying Safety Week. This will be a concentrated period of safety awareness involving every individual associated with flying operations. We in MAC have tailored our participation to suit our diverse types of flying operations. Our commander, General James R. Allen, believes Flying Safety Week can be a most worthwhile endeavor, and I want you to understand why.

MAC has made dramatic reductions in mishap rates over the years. Since about 1960, however, the rate has remained almost constant, hovering just below one major mishap per 100,000 flying hours. Not only have we not been able to reduce our mishap rate significantly further, we also keep having accidents for basically the same reasons. There haven't been any really new mishap causes in the last few years.

Flying Safety Week '82 is an Air Force-wide program, but it will be planned for the local level by your own unit. Whether or not we improve the MAC safety record will depend in large part on how well we take advantage of this opportunity. To increase our collective safety awareness we can step back and look at the way we do our jobs and correct those things we find that are not safe. But *you* are the key. We need your individual support for the command to benefit from this program.

We are also launching MAC's new mishap prevention program to coincide with and amplify the USAF Safety Week program. The "AWTH" program (explained on the following pages) will be a continuing initiative. It will give every person a chance to make a significant contribution to flight safety.

I cannot emphasize enough to each of you what improving our mishap rate really means. When we lose people in a mishap, it is tragic. Those so needlessly lost in preventable mishaps can never be replaced. Neither are funds always available for aircraft replacement. Defense resources are more precious now than at any other time in recent history. And because of this, it's critically important we preserve both the people and the material we have now to build an enhanced airlift force which will see us into the 21st century. I hope you understand how important this endeavor is, and how vital you are to its success.

I am looking forward to participating in Flying Safety Week with you and your units, and my staff will lend its full support to this important event. By working together we can achieve a safer and more effective future for the Military Airlift Command, the Air Force and for our country.

Louie O. McFeron

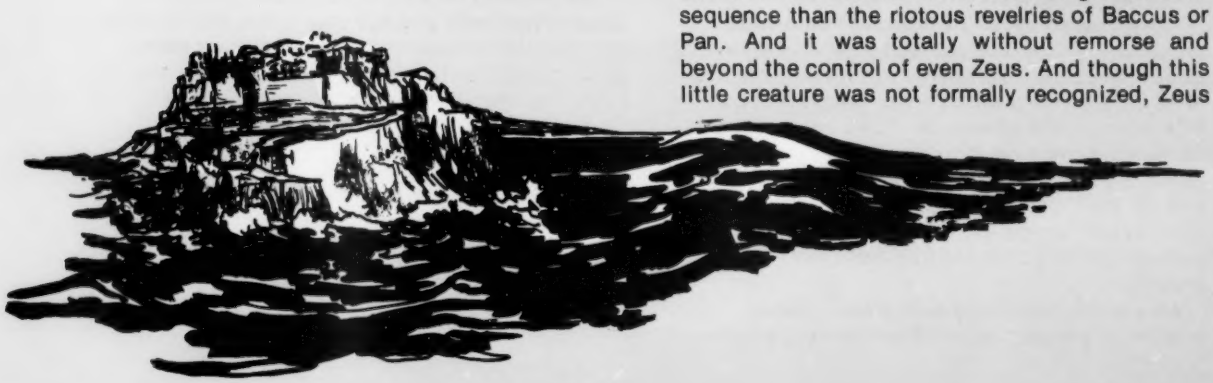
LOUIE O. McFERON, Colonel, USAF
MAC Director of Safety

The AWTH Factor

by Captain James C. White
HQ MAC / Flight Safety

Long ago, in the annals of Greek mythology, there lived a mortal named Daedalus. He was an architect and inventor by trade who constructed the Labyrinth in which King Minos confined the Minotaur on the island of Crete. When Theseus, another mortal, escaped from the Labyrinth, King Minos was sure that Daedalus had helped him. In his wrath, King Minos imprisoned Daedalus and his son, Icarus, in the designer's own Labyrinth. Daedalus, however, had a plan. He told his son that while escape was impossible by water or land, the air itself—the sky—was the only way to freedom. So that they might fly out, the father made two pairs of wings. They put on the wings and, just before they took flight, Daedalus warned Icarus to keep a middle course between the sea and sky, fearing that if they flew too high, the sun would melt the wax and cause the wings to drop off. But as so often happens, sage advise from old timers is often disregarded by youth—as we shall see.

Meanwhile, there also existed in ancient Greece a little known, seldom discussed, abominable little demon that was always present, but rarely if ever seen, waiting to take advantage of any shakey situation. Its actions were often of greater consequence than the riotous revelries of Baccus or Pan. And it was totally without remorse and beyond the control of even Zeus. And though this little creature was not formally recognized, Zeus



knew it was there. It was everywhere. Even as Zeus' power waned with the passage of time, the influence of this mighty little creature, called AWTH, waxed strong. AWTH remains today the only vestige of a time long since forgotten. It still relishes the enormous disaster protential today, just as it did then, on that warm sunny day thousands of years ago when Daedalus and his son escaped from the Labyrinth.

As Daedalus and Icarus spread their wings and flew lightly, effortlessly away from Crete, the delight of this new and wonderful power went to the boy's head. He soared without thought or care, up and up, paying no heed to his father's preflight safety briefing. Then, as the wax melted and his wings failed, he fell into the sea, where the dark blue Mediterranean waters closed over him. Daedalus circled over his son's watery grave and then tearfully, sorrowfully, continued his flight to Sicily and safety. Icarus was seen no more.

Many points can be derived from this Greek myth, but for aviators, this is the first recorded human factor mishap and the first in which the AWTH was a player. Icarus succumbed to its dark influence and himself became an Accident Waiting To Happen. He had the talent to fly state-of-the-art machinery plus a preflight briefing that covered essential safety-of-flight information. Still this mishap happened. It was caused by the pilot, Icarus, who disregarded sage advice which, if heeded, could have prevented his ultimate destruction and the loss of a valuable weapon system (set of wings), not to mention dwindling national resources.

In the story, Icarus, made a human error when he did not consider the consequence of his actions. He was observed breaking the rules and disregarding his father's pleas. Some skeptics will say the cause of this mishap could just as easily have been attributed to bad wax, poor quality feathers, or design deficiencies. But because the MDR exhibit was lost, there was no way these allegations could be substantiated, much to the chagrin of the stan-eval troops on Sicily. (This was also the first ops-maintenance battle over causality.) Little did either side know that the AWTH was the initiator of this discord. The AWTH Factor then is a human factor. AWTHs are those potentially disruptive, non-reportable items which affect safety of flight and fall into one of the following categories: physiological problems; aircrew/aircraft interface problems; and spatial disorientation problems. These are areas where there is a great mishap potential; where there is an AWTH (Accident Waiting To Happen) lurking. When you discover an AWTH in any of these three areas, we want you to tell us how you discovered it and what corrective actions you took. Please tell us what factors contributed to the AWTH, why you think the AWTH occurred, and your suggestions as to how to prevent future AWTH situations. Icarus didn't have a second chance, but you may. And you may be able to help others. Use your good fortune for the advantage of all. Let's make the AWTH as out of date as wings held together with wax.

You may be asking why we are initiating a formal human factors program now. Simple. We recently completed a 5-year study of 65 Class A and B mishaps. Of these 65 mishaps, 25 (or 40 percent) were human factor mishaps. But this 40 percent caused nearly 68 percent of the dollar losses and 68 percent of the fatalities. Since a minority of causes did the majority of the damage, this program is implemented to learn why, among other things, a pilot would fly a perfectly good aircraft into the ground.

As the wax melted and his wings failed, Icarus fell into the sea.

This program is not designed nor intended to increase your post-flight paperwork, or to fuel your distrust of HQ MAC, or to make you skeptical of our attempt to gather more information. Simply stated, we want to prevent the next mishap by gathering your thoughts and actions on near-mishaps and using this data to crosstell how certain situations were encountered and resolved. In truth, this program is for you and will only be as good as your inputs and our ability to crosstell your information to the field. In some situations we will take our findings, based on your inputs, to the command section for assistance in the resolution of certain safety of flight problems. Most, however, can be resolved at worker-bee level.

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THE MAC ACCIDENT WAITING TO HAPPEN PROGRAM (AWTH)

1. AIRCRAFT MODEL	2. TYPE MISSION *(Exercise, evaluation, training, etc.)*		3. METEOROLOGICAL CONDITIONS			
4. ☐ DAY ☐ NIGHT ☐ DAWN ☐ DUSK	5. PHASE OF FLIGHT	6. AFSC	7. AGE	8. GRADE	9. CREW POSITION	10. PERSONAL CODE

PLACE "P" BY THE PRIMARY FACTOR AND MARK [X] ALL CONTRIBUTING FACTORS, REGARDLESS OF SECTION

11. AIRCREW/ AIRCRAFT INTERFACE PROBLEMS

	ERROR PRODUCING FEATURES		SIGNAL INTERPRETATION ERROR		SHOWING OFF		**PERSONAL EQUIPMENT**
	EASILY CONFUSED CONTROL(s)		TOO SMALL		TOOK UNNECESSARY RISK		FLIGHT CLOTHING
	DIFFICULT TO LOCATE INSTRUMENT(s)		UNUSABLE DATA UNTIL TRANSLATED		OTHER		SPECIAL CLOTHING
	DIFFICULT TO READ GAGE(s)		USED AN INOPERATIVE INSTRUMENT		**MISSION STRESS**		ATTACHED ITEMS
	ERRORS FROM ILLUSION(s)		WARNING LIGHT(s) CONFUSED		CREW IRRITANTS		OTHER
	EXCESSIVE LAG IN SHOWING DATA		OTHER		EMERGENCY CONDITION(s)		**TRAINING DEFICIENCY**
	MISTOOK ONE INSTRUMENT FOR ANOTHER		**LACK OF DISCIPLINE**		FORMATION FLIGHT		CREW COORDINATION
	NON-DIRECTIONAL DISPLAY(s)		MOTIVATION		TASK SATURATION		LACK OF EXPERIENCE
	NON-DIRECTIONAL SWITCH(es)		OVER COMPETITIVE		WEATHER		LACK OF KNOWLEDGE
	POOR LIGHTING		OVER CONFIDENT		OTHER		POOR TECHNIQUE
	REVERSAL OF INTERPRETATION		UNDER CONFIDENT				PROCEDURAL ERROR
	SCALE INTERPRETATION ERROR		OVER EXTENDED CAPABILITIES				OTHER

12. AIRCREW PHYSIOLOGICAL PROBLEMS

	MENTAL STRESS		PEER PRESSURE		SMOKE / FUMES		**THERMAL STRESS**
	ANGER		PREOCCUPIED		OTHER		TOO COLD
	ANXIETY		SUPERVISOR PRESSURE		**FATIGUE**		TOO HOT
	DEPRESSION		UNHAPPINESS		CIRCADIAN FATIGUE *(Jet Lag)*		**VISION**
	DIMINISHED CONCENTRATION		OTHER		FATIGUE CAUSED BY EQUIPMENT		BLACKOUT
	DISTRACTION		**POOR DIET**		HANGOVER		GREYOUT
	EMOTIONAL PROBLEMS		HUNGER		INSUFFICIENT REST		OTHER
	FAMILY PROBLEMS		PAIN		OTHER		**OTHER FACTORS**
	FRUSTRATION		OVERWEIGHT		**ILLNESS**		EAR BLOCK
	GET-HOME-ITIS		OTHER		AIRSICKNESS		G-STRESSES
	INATTENTION		**RESPIRATORY STRESS**		MEDICATION		LACK OF STRENGTH
	INTERPERSONAL RELATIONSHIPS		HYPERVENTILATION		TRAPPED GAS		
	LACK OF AWARENESS		HYPOXIA		OTHER		

13. SPATIAL DISORIENTATION PROBLEMS

	SENSATION OF		CHANGE OF ATTITUDE *(Somatogravic Illusion)*
	CLIMBING DURING TURN		REVERSAL OF MOTION
	DIVING DURING TURN		STATIONARY LIGHT MOVEMENT *(Autokinesis)*
	CLIMBING DURING LEVEL FLIGHT		SPINNING *(Graveyard Spin or Spiral)*
	DIVING DURING LEVEL FLIGHT		DOING MANEUVERS NOT ACTUALLY BEING DONE *(Coriolis Illusion)*
	FALSE ROTATION *(Somatogyral Illusion)*		BLENDING OF EARTH AND SKY
	FALSE VERTICAL AXIS *(The Leans)*		RELATIVE MOTION
	FALSE VERTICAL AND HORIZONTAL AXIS DUE TO FALSE CUES		DIZZINESS, NAUSEA, OR CONVULSIONS CAUSED BY THE PASSAGE OF LIGHT THROUGH PROPS OR ROTOR BLADES *(Flicker Vertigo)*
	FALSE MOVEMENT IN RELATION TO OTHER OBJECTS		

14. OTHER REPORTS SUBMITTED AS A RESULT OF THIS OCCURRENCE *(OPTIONAL)*

15. NARRATIVE *(Provide a concise, chronological description of the facts and circumstances leading to this occurrence. Include what happened, how it was discovered, what actions were taken, evasive action required, factors contributing to the situation, why it occurred, and your suggestions on how to prevent recurrence)*

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Now, a few words on how the AWTH Program works. There are several factors you need to understand in order to help you participate in this new mishap prevention program. First, you have to be willing to share your experience with us. Without inputs, there is no program. Second, you have to take a few minutes to complete a form (which we will make available in all the appropriate locations) and send it directly to MAC/IGF. Of course, the quicker you send in the report the quicker we can get the word out to others. This report is totally anonymous. You need not tell us your name, social security number, or unit, although there is a provision for you to enter a personal code only you know. If we need more information on your report, we'll request it through *The MAC Flyer* by using your code so you can contact us and provide more information. If you do include your name, the form will be destroyed as soon as you are contacted to protect your confidentiality. Even if you don't include your name and phone number, once the data is entered into the computer the AWTH form will be destroyed. Fourth, there are no middlemen to intercept your information. This information cannot adversely reflect on you in any way because there is no intent to track the report to its origin. We have built safeguards into the system because we, the program originators, will one day be flying the line again, and want our inputs safeguarded too. Therefore, we must safeguard yours.

As previously stated, participation in this program is voluntary. Our interest is in saving lives, airplanes, dollars and dwindling national resources. Again, the report may be totally anonymous but it is your opportunity to communicate directly with HQ MAC Safety. If you want to have your voice heard or make your experiences count, get involved by joining the AWTH program. We want to know what is happening to you, how you solve non-reportable near-accidents and how you think we can help you prevent what might have been a disaster under other circumstances.

If you take just a little time to tell us your experiences, we will make your experiences available to others. To the end that your participation may be helping save somebody's life, you *can* make a difference.

AIRLIFTERS at RED FLAG

The Key is Preparation

Capt Paul "Pablo" Mattingly briefs aircrews on the routes they will use to the "targets" for the first day's missions.

by Captain Byron L. Howard
Associate Editor

With the strains of Willie Nelson singing "San Antonio Rose" lilting in the background, the MAC trailer seemed to take on a semi-surrealistic aura for such an early hour—0230. Captains Paul "Pablo" Mattingly and Kent Edie were nonetheless busy preparing the necessary facts which would be consolidated and organized into the first briefing for the first missions of Red Flag 82-2. The actual planning for this moment had begun months earlier in September at a planning conference with units participating in this particular Red Flag. And it would be many more such early mornings before the crewmembers of the 463d and 435th Tactical Airlift Wings would finally finish up and head back to their respective units. In between the first briefing and when the last piece of mobility gear was tied down on the last plane, however, many lessons would be learned and filed for future use—if the need ever arises. In any case, all the aircrews and maintenance personnel left Nellis richer in one important respect. They had all experienced Red Flag.

If you believe that all you have to do to fly in Red Flag is show up, kick the tires, light the fires and go, you're absolutely, 100 percent *wrong*. Units train very, very intensely just to come here to receive *more* very intense training. Air Force crewmembers who had attended previous Red Flags told me the more you trained before coming to Nellis, the more rewarding it was. So, just what is Red Flag? Is it, like the made-for-TV movie says "the ultimate game," or is it a worthwhile, albeit demanding, exercise?

What it is and isn't

First of all, Red Flag is not treated as a game. It is an ongoing, year-round exercise designed to give the most realistic training short of actual combat to aircrews of this country and our Allies. And it's not just for fighter pilots either. A usual 4 to 6-week exercise will typically see air superiority fighters, close air support and attack aircraft, strategic bombers, strategic and tactical transports all sharing the same airspace—the desert just north of Las Vegas, Nevada. Aircrews from every branch of the US armed services, NATO countries and other friendly governments have participated in Red Flag and its cousin Maple Flag. And it's for a very good reason.

After the Vietnam conflict, studies were done and the findings were significant—85 percent of the pilot losses occurred during the first 10 missions. After the 10th mission, the survival curve went up dramatically. But the question was how to provide the inexperienced aircrews the skills which were critical to survive in combat short of actual combat itself. The answer was Red Flag. It was established in 1975 to better prepare

SSgt Geralyn Conway, 463d TAW Intel NCO, briefs aircrews of the 463d and 435th TAWs where to find the "bad guys." The role of the intelligence specialist is taking on increased importance in MAC.

SSgt James K. Slaughter, 774th TAS loadmaster, demonstrates additional restraint used during Red Flag 82-2.

our forces for combat and assigned to the Tactical Air Command which provides this advanced readiness training. And it succeeds quite well, too. New tactics, new techniques and a free exchange of ideas are the hallmark of this innovative, realistic exercise.

The Road to Red Flag

So how does one get to Red Flag? Well, like Paul Hornung would say, "Practice! Practice! Practice!" The MAC mission commander for Red Flag 82-2, Lieutenant Colonel Darryl Otto, from the 774th TAS at Dyess, used nearly the same words:

"We picked the crews to best reflect all levels of expertise. Some of our guys had been to three or four Red Flags. One was a veteran of Cope Thunder, the Pacific Air Forces equivalent. Our navigator planner was a former F-4 backseater and a veteran of some of the earliest Red Flags. And on the opposite end of the spectrum, we had several loadmasters, navigators and pilots who were almost brand new. I think the one trait they all had in common was desire. They were self-motivated, knowledgeable, eager to learn.

"Since the area within a 100 mile radius of Dyess was designated a low altitude training area (LATN), we were able to plan our own routes to maximize our terrain masking. This freed us from the so-called 'canned routes,' and gave us the flexibility we would need to train effectively for Red Flag.

"We planned our routes as if we were already at Red Flag. We taught and used techniques proven effective in previous exercises. The crews were then given one day to plan the route and then actually study the 'lay of the land'—route study. Comsec and opsec techniques were also reemphasized.

"After all that, we flew the routes as planned. That may not sound hard, but our squadron tactics shop threw some realistic 'wrenches' into the preflight briefing which made it necessary for the crews to go to a secondary plan. Add a simulated ground attack, wrong authentication procedures by the designated DZ, a diversion to the alternate DZ, etc., and you had as realistic a training mission as we could furnish short of finding some F-5s to act as aggressors.

"The debriefings were interesting, and we learned even more than we anticipated. Flight engineers, for instance, discovered they were cut short if they didn't have a chart to help navigate. Now, almost all engineers know how to read and navigate a chart. This lesson really paid off when we finally got to Red Flag. Another lesson which yielded great dividends was the value of extra restraints by the guys in the back—the loadmasters. They not only took great pains, excuse the expression, to secure the normally loose

SSgt Rick Garcia, flight engineer, plots the route for his next mission at Red Flag.

items in the cargo compartment, but we were able to devise extra restraint for the loadmasters, themselves. The result: No injuries and a safe, effective operation."

The Players

It's not hard to tell the good guys from the bad guys at Red Flag. Or is it? There are two squadrons of aggressors or "bad guys," flying mean-looking F-5Es. The F-5E was chosen because it performs similar to MIG-type aircraft. When painted in camouflage patterns, it closely resembles aircraft of potentially unfriendly countries. The "aggressors" constitute a sizeable and ultra-realistic threat. Sometimes, though F-1 6s, and F-4s will become bad guys for a day to simulate other types of "threats." So it may not be as easy as you think to tell the good from the bad.

As for the other players, certain Red Flags may be keyed to certain players. For instance, one Red Flag may be geared to a rapid deployment force scenario. Still others may be geared more for electronics counter measures exercises. Or it may just be a "normal" Red Flag consisting of various and assorted aircraft. You know, the "usual." So how does MAC fit into the scheme of things?

Red Flag 82-2

Anyone who flies a combat aircraft has a vested interest in this exercise. And the main reason this intense environment exists is to train—*everybody*. For MAC, everyone from experienced officers and NCOs to "second balloons" and "mosquito wings" are included. A typical crew will normally have one or more crewmembers who have attended the exercise before. Included in this "typical" crew will also be pilots, engineers, navigators, and loadmasters who are almost fresh from flight school or tech training.

During the first Red Flag of the new calendar year, I was able to fly with crews from both Rhein-Main and Dyess. All the crews were well aware of the seriousness of the mission and the importance of its goals—learn by doing, be safe, go home and teach others. Maybe that's oversimplifying it a bit, but in essence, that's why MAC crews go to Red Flag. And it's not just limited to C-130 crews either. A typical trip through the desert will also find crews flying C-141s. Coupled with strong support from maintenance folks, and you have a team effort—combined, unified—with high esprit de corps. In a word, MAC's presence at Red Flag is *highlighted* by their actions. And the MAC crews sent here are professionals.

A "Typical" Mission

Following a thorough introductory briefing Sunday and a "fam" (familiarization) flight on Monday to acquaint crews with the exercise areas, the "players" were finally ready to go out and in

Capt Bob "Animal" Ain, 774TAS IP, looks over the instruments prior to taking off on the first sortie of Red Flag 82-2.

Here a 435th TAW crew chief scouts for potential trouble.

the current Red Flag jargon, "drag their trunks in the dirt" at "the speed of syrup."

[*Ed Note: Fighter jocks often refer to dragging their "fangs in the dirt" at the "speed of heat." Since airlift types can't go quite that fast, and since we don't have any "fangs,"—AC-130s don't count—a new "slow-mover" jargon was developed out of necessity.*]

I flew this typical mission with Captain Anthony "Tony" Nazario and his crew from the 37th TAS.

Preflight briefing, crew briefing and all ground operations were routine. The roar of F-100 jet engines from the taxiing F-15s and F-16s added to the anticipation. After a formation takeoff we proceeded to an orbit point. We were almost in the exercise area and we expected exciting flying shortly. Our formation was split up to fly single-ship, low-level routes into and out of the area, then rejoin at the same orbit point and RTB (return to base). Sounds normal, doesn't it? It wasn't.

Shortly after dropping down to 300 feet AGL, the crew began to exercise their combat eyeballs by trying to spot the "bad guys" before they spotted us. The ruling principle at Red Flag is simple: To see is to live. It didn't take long for us to "find" an F-5 and "trap him at our 6 o'clock" which is fighter talk for getting "bounced." Tony and his crew did exactly what they had to do short of pulling out a .38 and blasting the F-5 which then pulled off and made a mad dash for home. An F-15 had materialized out of thin air and "persuaded" the aggressor to leave us alone. We made it into and out of the area as we had planned and nobody else spotted us. As long as we had terrain to help us, we were okay. The debriefing at the end of the day revealed that all C-130s had managed to make it to the target and escape—thanks to our CAP (combat air patrol).

Aggressor aircraft aren't the only "threats" at Red Flag. Numerous ground threats in the form of AAA and SAM radar simulations are scattered throughout the range and serve to make life miserable for anyone unlucky enough to be caught in their sights. The videotape shown in the mass debriefing at the end of the day's sorties can be revealing, to say the least, because cameras don't lie. (I've been told that other ground threats exist in the Nellis area. These aim for your quarters or half-dollars and have only one arm.)

In the end, MAC crews lucky enough to have a chance to attend Red Flag or Maple Flag up North, come back with that small but decisive edge in "combat" experience. Since its inception in 1975, many MAC crews have been effectively and safely honing the skills that may be necessary if we ever have to do it for real. Everyone in our command can be proud of those who bring back the lessons learned at Nellis. The payoff is nothing less than greater effectiveness and safety in combat airlift operations—and that's what it's all about.

Mishap with a Moral

STALLED

The commercial DC-10 departed Frankfurt, Germany about 2200 hours on an IFR flight plan to Miami. There were 295 passengers, 3 crewmembers, and 13 flight attendants on board. Ground operations, takeoff and initial portion of the enroute climb were uneventful. Air traffic control cleared the heavy trijet to climb at 283 knots, the appropriate speed for the heavy weight of the aircraft. The captain continued to control the aircraft manually to 10,000 feet. According to the crew, after reaching 10,000 feet, the autopilot (AP) was engaged in the indicated airspeed (IAS) hold mode and the auto-throttle system (ATS) speed selector was set at 320 knots. But while climbing through 14,000 feet, the autopilot "kicked off" and was reengaged by the pilot.

A few minutes later, while climbing through 27,500 feet about 100 miles west of the departure airport, the DC-10 started to vibrate slightly which, within seconds, increased in intensity. The crew suspected an abnormal vibration in number 3 engine, elected to reduce power and then to shut it down. As soon as they reduced power on number 3 engine, the autopilot disengaged, the aircraft rolled first right, then left, and then the nose suddenly pitched down and they started losing altitude—fast.

As the aircraft's nose continued to drop, the captain deployed the spoilers to arrest the impending overspeed condition that was created by the aircraft's nose-low attitude. The flight recorder readout showed a recovery starting at 23,900 feet with vertical acceleration reaching a maximum of 1.68 Gs during the recovery process. The crew regained full control of the aircraft at about 18,000 feet.

Shortly after recovering control of the DC-10, the crew restarted number 3 engine and it appeared to function normally. They had requested a diversion to Madrid, Spain but since all systems appeared normal, the crew elected to continue to Miami as if nothing had happened. The flight landed at Miami, Florida at 0105 local time.

After shutting down, the captain asked maintenance personnel to visually check the aircraft's exterior. Maintenance found that four feet of each outboard elevator tip and the aircraft's tail-area-lower-access door were missing. The DC-10 was grounded at Miami, Florida where it underwent a thorough examination. All systems that could have induced the condition experienced by the crew during the incident were functionally checked. These included the flight control systems, the autothrottle system, the flight director/autopilot and the number 3 engine. No discrepancies were found.

Analysis

The aircraft's flight control systems and powerplants operated normally both before and after the incident. There was no evidence that any malfunction of the aircraft systems occurred. The structural

damage, which was limited to the empennage and aft fuselage, was attributed to the application of high loads caused by the stall buffet. No indication of preexisting fatigue cracking was discovered.

The flight data recorder indicated that the aircraft's airspeed continued to decrease during the climb. The stall speed of the DC-10 for its climb weight was determined to be 203 knots and the buffet onset speed was approximately 234 knots. According to the flight recorder, the aircraft was operated below 234 knots for over 40 seconds while climbing above 26,000 feet. For half of this period, the airspeed was below 203 knots. The minimum speed recorded during this portion of the climb was 176 knots, well below the stall speed. The National Transportation Safety Board (NTSB) concluded that the DC-10 entered a full aerodynamic stall.

Why would an experienced professional flight crew unknowingly allow a DC-10 aircraft to fly into a full aerodynamic stall? Evidence clearly indicates the aircraft was maintaining a constant vertical speed (1,200 feet minute) during the period immediately preceding the stall. And thrust from all three engines was at an autothrottle limiting value for several minutes during which pitch attitude increased and airspeed decreased. Here the DC-10's autopilot system was commanding aircraft pitch attitude and the autothrottle system was controlling thrust during the climb. The aircrew had mistakenly placed the autopilot system in a vertical speed mode rather than an airspeed or Mach command mode. This was contrary to both the airline's normal procedures and the manufacturer's prescribed normal operating procedures and recommendations.

From the time the pilot reengaged the autopilot, up to the point the aircraft stalled at 28,800 feet, the DC-10 was in this vertical speed mode. Meanwhile, airspeed was bleeding off and the aircrew was not aware of it. The autopilot was commanding an increasing pitch attitude necessary to achieve the selected vertical speed, regardless of the aircraft's airspeed or pitch attitude (which increased to 14° nose up). Add the DC-10's stickshaker alert (which investigators determined was indeed activated) to the situation and you have multiple warnings available to alert an aircrew of an impending stall.

The DC-10 started to vibrate slightly which, within seconds, increased in intensity.

The Safety Board concluded that the crew's attention must have been diverted from the control of the airplane and from instrument scan soon after reengaging the autopilot at 14,000 feet. Believing that the autopilot was effectively maintaining a satisfactory climb attitude and speed, they were probably quite surprised at the onset of sudden vibrations, buffeting, and activation of the control column "stickshaker." They consequently misinterpreted the cues as an engine problem. When they retarded the number 3 engine throttle, the resultant decrease in total thrust along with the thrust asymmetry only aggravated the aircraft's entry into a full stall.

Probable Cause

The NTSB determined the probable cause of this incident was the failure of the flight crew to follow standard climb procedures and to adequately monitor the aircraft's flight instruments. Their inattention resulted in the jetliner entering a prolonged stall buffet which placed the aircraft outside the design envelope.

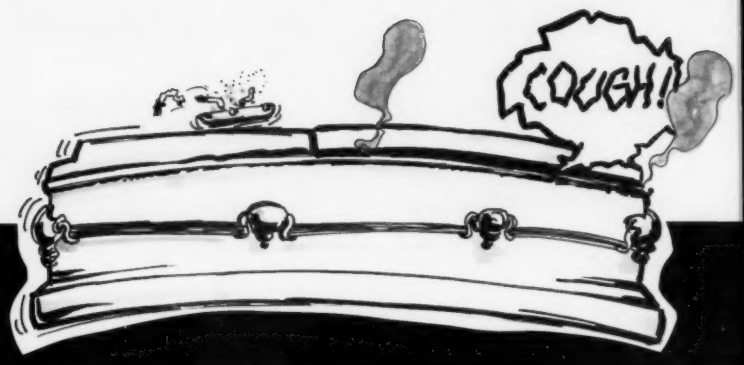
Although the crew failed to recognize the approach and entry to the stall, they did, after approximately 1 minute, recognize the aircraft's stalled condition. They also responded with proper control inputs to recover the aircraft. A full minute for stall recognition is excessive, however. And at a lower altitude it could have very well caused the destruction of the aircraft and the deaths of hundreds of passengers.

The Safety Board also believed either a visual or aural warning device for the DC-10 would have aided the crew's stall recognition problem and might have prevented the material damage to the aircraft by causing the crew to react faster.

In this mishap the crew flew a transoceanic crossing to their destination after the incident. The violent and unexpected nature of the stall and recovery maneuver and the crew's lack of understanding as to why it happened should have been sufficient reason to get the plane on the ground as quickly as possible. Normal caution should have dictated this action. In this case, letting "George do it" would have been fine if someone had taken a more active interest in what "George" was doing.

—Adapted from *NTSB-AAR-80-10*

Doc Talk



There's more to a smoke than just tar and nicotine.

by Major William K. Sullivan, USAFR, MC
and
Captain Randall P. Provost, USAF, MC
Flight Surgeons, USAF Medical Center
Scott AFB, Illinois

Lt. Joe Glutz: Hey doc, why all the huffing and puffing about smoking? I can't get near a flight surgeon anymore without getting a lecture about it. It seems like a lot of noise about a bunch of theories.

Doc: Wrong-o, nicotine breath! It is true there are a lot of chronic diseases caused or made worse by smoking, but let's look at some of the immediate effects it has on you. Tobacco smoke is composed of numerous compounds. The nastier of these ingredients are tar and nicotine. Tar is deposited in the lungs as a tenacious stain and is a known cancer-causing agent (carcinogen). Nicotine causes blood vessel constriction. This cuts down on the blood flow and the oxygen delivered to your brain and body. It's the cause of the "buzz" a smoker gets when inhaling. Think of it like this: the brain is deprived of normal blood flow and oxygen supply and a mild hypoxia ensues. This depressed and potentially dangerous state of reduced mental capacity is interpreted as a stimulus or "buzz" by the unwary.

Tobacco smoke has other "good" stuff in it as well, including:

- Cadmium which is a persistent lung toxin and now a suspect in the formation of emphysema for which we have no cure; and
- Carbon monoxide which elbows its way onto red blood cells in place of oxygen and stays there for extended periods after smoking. We know that people with smoking-induced carbon monoxide levels lose the ability to distinguish relative brightness and judge time intervals. These people may also take longer to respond to stimuli such as warning lights. In addition, they've shown decreased performance on psychomotor tests.

Lt. Glutz: Ah, come on doc, that sounds like stories from the altitude chamber.

Doc: Bingo lieutenant. You're starting to catch on.

Lt Glutz: Hmm, is that about it?

Doc: Not by a long shot, amigo. Tobacco smoke also contains:

- Formaldehyde—the strong caustic-smelling stuff known and loved by freshman biology students everywhere for the way it burns eyes and irritates skin in laboratory classes.
- Hydrogen cyanide at a concentration of 1,600 parts per million, or 160 times the level considered dangerous.
- Nitrogen dioxide at 50 times the danger level.
- Ammonia, benzene, and hydrogen sulfide to name just a few. And if you happen to smoke mentholated cigarettes, you might be surprised to learn these little beauties are worse than plain tobacco smoke for knocking out the natural self-cleaning mechanism of your lungs. This is because the plumbing in your chest is lined with microscopic hairlike projections called cilia which constantly sweep back and forth to help remove the dust, germs, and other junk floating in the air. And everytime you inhale, this stuff sticks to the moist lining of said plumbing. But if you smoke even a half a pack per day of plain cigarettes, or even less of the menthol variety, you are just paralyzing the daylights out of those cilia. With the crippled cilia, you are much more susceptible to lung infections and other troubles. This is one reason why, in the U.S., smokers as a group

spend an estimated 88 million more days sick in bed each year than nonsmokers.

Lt. Glutz: Okay, okay, so you've made your point. Now how about all those long-term threats I keep hearing about, like death on the distant horizon?

Doc: Well, let's take a look at some current health statistics:

- Cigarette smoking is clearly the largest single preventable cause of illness and premature death in the United States.
- One-third of adult Americans smoke.
- Approximately 10 million Americans currently suffer from chronic debilitating diseases caused by smoking.
- Some diseases or harmful effects associated with smoking are: Heart and blood vessel disease

Chronic bronchitis	Sinusitis
Emphysema	Eye irritation
Stomach Ulcers	Burns
Urinary bladder cancer	Lung cancer
Larynx cancer	Pharynx cancer
Oral cavity cancer	Esophageal cancer
Pancreatic cancer	

Lung cancer kills about 100,000 people every year in this country and approximately 85 percent of these deaths are directly related to smoking. Smoking can double your chances of developing heart disease and if combined with other factors, can increase the risk even more. Heart disease is the leading cause of non-accidental death in the Air Force. Between 1969 and 1977 there were five mishaps where the cause or possible cause was attributed to inflight heart attack.

Lt Glutz: But I'm only 25. That heart attack stuff is for older guys—like my squadron commander.

Doc: Guess again, lieutenant. A recent fatal aircraft accident involved a 24-year-old pilot and a 25-year-old weapons system operator. Autopsies showed both men to have severe coronary atherosclerosis (hardening and blockage of the arteries supplying blood to the heart). This condition is a heart attack waiting to happen. These findings are just one example of a disturbingly frequent problem observed in young men. Tobacco smoke has been implicated in electron microscopy studies as damaging the linings of the arteries and setting the stage for this kind of trouble.

Lt Glutz: Well, okay, so I'm convinced. But what good will it do me to stop if my fate is already sealed?

Doc: The picture is not that grim, Joe. People who quit show rapid improvement in a lot of these areas. Ciliary function recovers fairly fast and quickly begins cleaning up the lungs. The risk of heart trouble begins to decline when you quit and within about 10 years the ex-smoker is at the same risk as a non-smoker of the same age. The risk of lung diseases of many kinds begins to drop off also as soon as the smoker quits. After 10 smoke-free years the risk is probably back to normal.

Lt Glutz: But what if I gain weight when I quit?

Doc: This sometimes occurs and results from several things, one of which is the fact that the body becomes more efficient at utilizing food. In the absence of the harmful effects of tobacco, the body may increase in weight without any actual increase in calorie intake as it shakes off the various toxic effects of smoking. Then again, everyone does not gain. In one national survey, one out of four ex-smokers actually lost weight. But think of it this way—it's a lot easier to shed a few pounds than to get rid of a tumor or to deal with the crippling effects of emphysema. If you look at the consequences, there is no real choice except to quit.

Lt. Glutz: Okay, so maybe I'll give it a try. Any advice?

Doc: Sure, First you have to really want to quit. And thinking about all the deadly effects of tobacco smoke I've just reviewed should help increase your desire to kick the habit. Or maybe you want to quit because you don't want your kids to smoke. Studies show that if you smoke, your kids are certainly more likely to. Do it for any reason, but realize that you must be seriously motivated. There are lots of tricks to help you along. Here are a few suggestions:

- A bet or pact with a friend or spouse.
- Set a cutoff date and promise yourself to quit on that day.
- Make yourself aware of each and every time you light up. Keep the pack and the lighter in separate and somewhat inconvenient spots.
- Ration yourself a set number of cigarettes each day and taper off to zero cigarettes on a schedule.
- Check into anti-smoking clinics in your area or ask your friendly flight surgeon or family doctor for more advice.

Lt. Glutz: Thanks doc. You've sold me. I think I can live without 'em. (Cough! cough!)

Authors' Note. Thanks to the American Lung Association which provided valuable information in the preparation of this article.

Fiat G.222

The origin of this Italian airlifter can be traced back to the early 1960s when NATO requested proposals for a fighter and a transport with vertical and short takeoff and landing (V/STOL) capabilities. Eventually, both concepts were dropped because of technological hurdles but the basic G.222 design was distilled from the initial design work and simplified into a more conventional STOL transport aircraft. The prototype first flew on 18 July 1970. Today the aircraft is in service with the air forces of Italy, Argentina, Dubai and Somalia.

A simple twin-turboprop design, the G
low cabin floor which are common to ma
wing itself is equipped with widespan, d
flaps, and spoilers on the outboard sect
flotation main landing gear with tandem
levered suspension which makes the air
operations from austere airstrips. An im
smaller transport is its kneeling capabili
the C-5. The height of the cargo bed can
extending or contracting the hydraulical
sorbers of the main landing gear.

Powered by two 3,400 shp T-64-GE-P4
under license by Fiat, the G.222 can be f
nautical miles. A crew of three—pilot, c
engineer/radio operator—is the norm. S
troops or 32 paratroops is available. The
over 58,000 pounds. The G.222 also spo
speed and a service ceiling of 25,000 fee
service are operated by the 46th Brigade
relative newcomer will give its users gre
capability in the coming years.

Allied Airlifters

the G.222 has a high wing and
o many airlifters today. The
an, double-slotted trailing-edge
section of the wing. The high-
dem wheels have independent-
e aircraft very capable of
n important feature of this
ability—similar in concept to
d can be raised and lowered by
lically operated shock ab-

E-P4D engines manufactured
n be ferried a maximum of 2,760
lot, copilot and flight
m. Seating for 44 fully equipped
. The maximum takeoff weight is
sports a 250-knot max cruise
0 feet. Most of the G.222s in
gade based at Pisa, Italy. This
s greatly expanded airlift

You're Not Just a Pilot, You're an *AIRCRAFT COMMANDER*

by Captain David F. Todd
Special Airlift Director
HQ MAC

As a wing flying safety officer, I sat in on many of the weekly Wing Commander's Review and Certification Boards. During these boards, I heard a multitude of philosophies about being an aircraft commander or instructor, from a diversity of "old heads." A diversity not only in their wing positions (CC,CV,DO,MA,TR) but a diversity in their flying experiences (C-124, C-133, B-47, B-52, C-5, C-130, C-141, and others). In time, I collected bits and pieces of safety philosophy, advice, threats, and warnings that I think should be passed on. Some of these opinions you may disagree with, and that's okay. Just take this opportunity to listen and think—it might make you a better aircraft commander.

One of the major themes that came out of all boards was the fact that you were an aircraft commander, not just a pilot. You could teach a monkey to fly, given enough bananas. But to be a good commander takes experience, time, and mistakes. Unfortunately, you don't teach an aircraft commander. There is no formal school or text book you can read that will give you all the answers. A copilot learns how to be a commander from line flying experiences, and from other ACs.

An aircraft commander has three major areas of responsibility: to the crew, to the aircraft, and to the mission. These responsibilities are pretty hard to separate or prioritize. However, in certain situations, one responsibility will often outweigh the others. When you've got three turnin', and one burnin', your mission responsibility is probably secondary to your responsibilities to your crew and to your aircraft.

But then, you must accept responsibility for all three areas to be a good commander. I'm sure you've flown with people who have been great with the crew, got the job done, but were shakey to fly with. You only want to fly with them once. Likewise, there are people who fly great, get those on-time departures, but their crew coordination and crew discipline is the pits. To be a good AC, you have to master all three responsibilities.

To Your Crew

To know, understand, and work effectively with the people on your crew is a difficult challenge, to put it mildly. To maintain aircrew discipline and aircrew coordination can sometimes require kid gloves, or a size-10 boot, depending on the situation. It helps to have a working knowledge of crew duties as well as the crewmembers themselves. It also helps your credibility to know a little about all the crew positions. The purpose is not to tell them how to do their jobs, but to make you aware of what each crewmember does. Don't just learn how to read a Form F, learn how to fill one out. I remember looking at a Form F on a SAAM mission I was flying. One flight station position had an enormous weight loaded on it, more than the floor was stressed for. I queried the young loadmaster, and he said that was the weight on the placard attached to the forklift. We walked back to confirm this, and discovered that this weight was the lifting capacity of the forklift, not the actual weight of the forklift, itself.

Also, know how to use a tie down strap, or how to lock a pressure door. Know how to start the APU, or what is required to refuel the aircraft.

These are little things that will help increase your credibility with the crew, but it does something else too. When you are pushing your crew duty day, you'll have a better idea of how far your crew can safely go before fatigue reduces their performance. Knowing your crew's capability will enable you to know their limitations, too.

In addition, knowing a little about crew duties allows you to ask the right people the "right" questions. You don't see too many 10,000-hour patches in MAC, but when you do, you may want to ask for and listen to their opinions. That is not to say that the crew votes on a decision. It's your decision—*you* are the aircraft commander.

Working with and knowing about your crew will also help you with the maintenance troops, transportation people, and the command post. Having an AC and another crewmember give different stories to them is definitely poor form. If the members of your crew have an honest difference of opinion, work it out in private, not in front of the command post window or the maintenance supervisor. In other words, it's united we stand, divided we fall. Remember, the job requires a crew, not a group of individuals.

Over the past few years, we have acquired quite a few new people in our MAC system. They are good people, eager to learn, but they are also inexperienced. You have to know the books because you are responsible for their actions. Likewise, remember that even though you are an aircraft commander, you are an instructor too. A large percentage of what our new people learn is from the AC and basic crewmembers, not from instructors or flight examiners. Likewise, people often learn more from the example you set rather than what you teach. So take time to teach these people and practice what you teach; you will probably fly with them again.

As I mentioned earlier, learning to command a crew is mostly an informal process. However, for the next two responsibilities, to your aircraft and to your mission, we in MAC have developed a formal process to educate you on your responsibilities.

To Your Aircraft

When you have upgraded to AC, you have run the gauntlet of route familiarizations, local checks, and your AC route check. But having met the MAC standard, don't stop there. Your learning curve will plummet rapidly after your checkride unless you stay in the books. So, stay in the books, especially aircraft systems. Know not only what to do, but why you do it. Most of our aircraft are old, and you might get in one of those situations. I remember departing in a C-141 a few years ago on a layered, overcast day. While on the SID, the AC's ADI began to tumble right, just as my ADI began tumbling left. Maintaining VFR between the cloud layers, we began to troubleshoot the system. All generators checked normal, but both ADI's were still tumbling. After exhausting the book procedures, we confirmed that my turn and slip indicator was good and put all four generators in isolated mode. With Travis at minimums and no VFR (not even Nellis!) between Travis and Norton, we elected to press on to Norton. Using a straight ahead climb, we entered the clouds at 6,000 and exited at FL 340. In the clouds, my ADI came back, but we didn't use it until we could confirm its accuracy. We landed VFR at Norton—that is, as VFR as Norton ever gets. The subsequent investigation revealed a malfunctioning number 1 generator had disrupted both ADI's. By going to isolated mode, we restored one ADI (the copilot's) back to normal operations. This kind of "off-the-wall" situation may happen more and more, and is a good example of why one of your responsibilities must be to your "aeromachine."

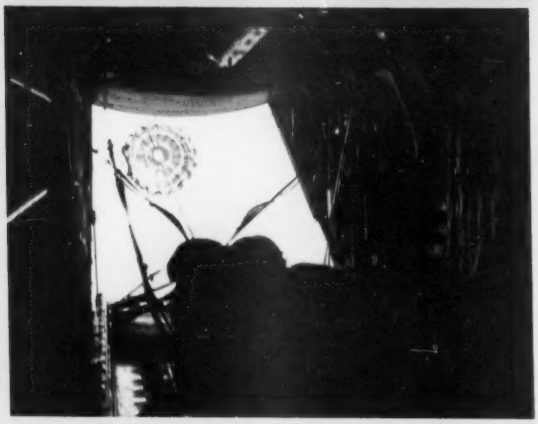
Also, know the regs and your performance section. With our worldwide commitments, it's no telling where you will be flying. In MAC you're bound to see different climatic conditions, runways and terrain types. So, know your aircraft's capabilities, and its limitations.

So far I've described your responsibilities to the crew and to the aircraft. But unless you can use them to accomplish your mission safely, it's all for naught.

To The Mission

To MAC, getting the job done—which usually means delivering the goods—is what it's all about. MAC has to do the job because, very often, we are the only ones who can. Therefore, the final responsibility for the mission falls on you, the aircraft commander. Of course, you haven't been thrown out in the cold in this tasking. Your training is designed to assist you to accomplish the mission. And complete mission preparation is the first step in getting the job done right.

There are a number of references you need to look at before you fly, and being familiar with all the various pubs will help you tremendously.



C-130 photo by MSgt Don C. Sutherland

Remember, people don't print these pubs for their health—they are published for you. One of these "good books" is the Foreign Clearance Guide (FCG). There's also the classified FCG in base ops. I know, you don't go anywhere you need classified information. Well, how do you know unless you check the book? FLIP is the next reference that can be invaluable. The basic and area planning sections are important and necessary to your flight planning. Other pubs that help you safely complete your mission are the IFR supplement, VFR supplement, numbered air force airfield operating restrictions, airfield qualification slide/tape presentations available at your wing learning center, MACR 55-XXX series, and approach plates. Also, what about a terrain chart of your departure and destination; you will be amazed at what you can learn from a properly annotated chart. All these materials, if used regularly, will help you immeasurably in your mission preparation. I can remember one of those publications saved an embarassing moment a few years ago.

It was my first trip out as a copilot on Reforger. As we were approaching our destination of Oostende, Belgium, the French controller gave us an enroute descent to a visual. Actually, they told us to follow the coast till we could see the field. We spotted an airfield at 2 o'clock, and the AC lined up on about a 6 mile final. I called the tower, and then received clearance to land. The approach plate showed one runway, but as I looked out, I saw the field we were on final for had a crossing runway. I grabbed the chart, and confirmed we were landing at the *wrong* airfield. Making a go around at 5 miles, we slipped 5 miles north to the correct airfield. You could've heard a pin drop in the cockpit.

If you know the user s requirements and work with the MAC command and control system, chances are you, your crew and your airplane will get the job done. And if you have an idea about how to better accomplish the mission, then offer the suggestion. You are the one with the most up-to-date information, so use it. Above all, it comes down to safe mission accomplishment.

You can probably add items of advice to each of the various areas of responsibilities. But remember, "good" aircraft commanders realize their responsibilities and meet them. Doing this will enable you to accomplish your mission in the safest and most professional way. When you're the aircraft commander, you are more than just a pilot.

The scoutmaster, the football hero, and all the other crewmembers were . . .

Real People

by Captain Jerry M. Brewton
Det 2, 67th ARRS
Ramstein AB, Germany

Introducing Captain Matthew Dillon, 34-year-old C-130 instructor pilot originally from Watertown, Massachusetts. He attended Northeastern University where he majored in law enforcement. He entered the Air Force in 1971 and has logged over 3,000 hours in MAC aircraft. He met his wife Kate while attending pilot training in Laredo, Texas. Today Matt has an easy flight. He's scheduled to fly down to Homestead AFB in Florida, drop off a few pallets of cargo there, and return tomorrow. Captain Dillon in the base ops weather shop is about to get a briefing for the flight south.

"Morning Sergeant Theodolite. How does it look for a trip to Homestead today?" asks Matt.

Master Sergeant Eddy Theodolite has already reviewed Matt's mission and has a weather briefing ready and waiting. "Homestead's reporting ceiling and visibility unlimited. Most of your route is VMC. The only problem you might have will be getting out of here. There's a front west of here that's been kicking up some really nasty stuff. There's thunderstorms with tops to flight level 450, severe turbulence in the clear ahead of it, hail, and even a few tornadoes. The way it's been moving, the bad stuff shouldn't get here for 3 or 4 hours. Till then, we'll be around 500 feet scattered with 3 miles visibility. Intermittently we might go as low as 300 feet and 1 mile in rain showers. Winds are 280° at 10 knots gusting to about 15."

"That doesn't sound too bad if we get off on time. Anything else?" questions Matt.

"We're coming out with a weather advisory for low level wind shear from surface to 2,000 feet. I just had a pilot report from a C-141. He said cloud tops were at 5,000 feet and he encountered some moderate chop on final. If you can get off in the next couple of hours it ought to be smooth sailing once you reach those cloud tops."

Captain Dillon is only moderately concerned about the weather forecast as he discusses the mission with his two able assistants, Major Neil George and Second Lieutenant Andy Hardy. Major George, navigator extraordinare, likes to joke about having a first name for his last name too. He's found his way safely around 5 continents, 4 oceans and 39 countries. A squadron flight examiner, he's logged over 6,000 hours in everything from F-4s to C-5s. Second Lieutenant Andy Hardy is fresh out of pilot training. He played cornerback at Oregon State University where he majored in biology. Hardworking, conscientious, and eager to learn, he's considered one of the best copilots in the squadron.

"Well Neil, what do ya think?" queries the AC.

"Shouldn't be any problem unless that front speeds up or we have some sort of delay. I've got a canned route of flight and I

Honorable Mention, 1981 MAC Flying Safety Writing Contest.

rechecked everything along the way. We'll take the Hunter Two departure out to Bubble Gum intersection, then we'll hop on old Victor's airways and drive on down to Homestead," explains the nav.

"Anything in the notams, Andy?" asks Dillon.

"I checked for the entire route and there's nothing to cause any problems. The PAR is out at Patrick AFB and Homestead's VASI lights are out," comments the copilot.

"Sounds like you guys have covered all the bases. Let's file our flight plan and grab a little breakfast."

The flight plan is now on file and three stomachs are coated with grease. The crew is ready to depart. Sometimes things don't go as planned. Today is no exception.

Wind gusts to 40 kts . . . possibility of hail

The base ops dispatcher calls out, "Captain, oh Captain, you have a phone call."

"Captain Dillon here. Yeah. How many? Two. A colonel? Okay. How soon? Yeah, we're headed for the aircraft now. Tell them to hurry. The weather will be movin' in soon."

"What's up Matt?" questions the nav.

"Couple of pax, Neil. Andy, call transient alert and pass a message to Sergeant Villa. Tell him we've got a couple passengers. One's a 'code 7' and the other is a captain. Pax and bags total 480 pounds. I've got to make a couple of changes to our flight plan," explains the AC.

"What sort of changes have we got Matt?" questions the nav.

"Nothing Neil. We're going to have to stop by Eglin and drop off our passengers," adds Captain Dillon.

"What's with the pax? I thought we had so much cargo that we weren't going to open any seats," complains Major George.

"Special request. They're part of a safety investigation team. An A-10 plowed up the approach lights at Eglin yesterday and they want to get there ASAP," briefs the AC.

After amending the flight plan, Matt and his crew arrive at their trusty Hercules.

MAC 099. It's a healthy C-130 just a couple thousand hours past puberty, but still very much in its prime. This aircraft is a survivor of one war, three birdstrikes (one of them sitting in a tree), extended temporary duty to some of the world's least exotic places, and a survivor of literally hundreds of crewmembers. Herk isn't feeling quite up to par today. It has a belly full of cargo and the cold wet weather is making its circuits feel a little sluggish.

"Sergeant Villa, is everything ready?" challenges the AC.

"Yes sir. I double checked all the weights and I put some troop seats in for the pax. They're next door having a cup of coffee," explains the loadmaster.

"Any problems with the load?" questions Captain Dillon.

"One pallet had some hydraulic fluid leaking from a crate of truck parts. I had that box pulled. Good thing. It made enough room for our passengers. Sergeant Barrow says that we're right at max gross weight," briefs the loadmaster.

Staff Sergeant Pancho Villa is a 23-year-old loadmaster with over 2,000 hours in C-130s. A perfectionist, he doublechecks every piece of cargo that goes on his aircraft. Away from work he is deeply involved in community activities. He serves as a scoutmaster, Little League coach, and swimming instructor for the Red Cross. He attends college at night and hopes to have his engineering degree in another 18 months. He has been married since he was 18 and has two children. His wife works in the base finance office.

"Captain Dillon, maintenance is coming out to look at the number 1 engine. The crew that flew this bird yesterday wrote it up for oil pressure fluctuations. Maintenance changed the pressure transmitter and it ops-checked good. There's a little spot of oil on the ramp and I want them to check for any possible leaks. It shouldn't take too long," briefs the flight engineer, Sergeant Barrow.

"Anything else?" questions the AC.

"On the first takeoff yesterday the gear wouldn't come up. They recycled the switch and it works okay. The electrician found a bad relay in the actuator circuit."

In 5 minutes the source of the leak has been found. It's a loose coupling on one of the return oil lines. While this minor repair is being made Captain Dillon continues his discussion of the day's mission with Master Sergeant Clyde Barrow, the engineer. Sergeant Barrow wants the AC to go over all the duties and responsibilities of a flight engineer with his student flight engineer. He thinks a few words from Matt will help because this is his first flight. His name is Pat Garrett.

Master Sergeant Barrow has been associated with MAC aircraft for 17 years. Everything MAC flies now, he's flown. Everywhere MAC goes, he's been. He received a silver star in 1969 for dashing across the ramp and pulling a pilot from a burning aircraft during a rocket attack at Da Nang Air Base, Vietnam. He received third degree burns on both arms and shrapnel in the calf of his leg, but he has no memory of anything that happened on that day. He does remember a day 3 months earlier. Then a small arms attack left him so paralyzed with fear that he was unable to move to help his best friend who lay wounded 20 feet from the revetment where he had sought shelter. He knows the idiosyncrasies of every system on the Hercules and has helped cope with over a dozen critical inflight emergencies during his career.

The forms are cleared, all crewmembers have been thoroughly briefed, and all checklists have been run.

"Ground, MAC 099 is ready to start engines. We have information 'bravo,' " radios the copilot.

The ground controller calls back, "Roger 099. Cleared to start. Charlie on ATIS."

The copilot pulls up the UHF button to get the new information. "Information charlie. 0335 special observation. Winds 290° at 8 knots gusting to 18. Ceiling 300 feet, visibility 1 mile in rain showers. Altimeter 29.65 and falling. Temperature 15° centigrade. Pressure altitude plus 4,000. Met watch advisory. Potential low level wind shear surface to 2,000. Towering cumulonimbus 25 miles southwest moving northeast. Inform controller on initial contact you have information 'charlie.' "

Four props turn. The gauges are good. All checks are complete.

"Ground, MAC 099 taxi. We have 'charlie.' "

"MAC 099 is cleared to taxi back for a runway 25 departure. Altimeter 29.63. Winds are calm."

POLC—100% !

"Hey man, the winds are calm," the copilot reasons. "We can take off on runway 07 and save having to taxi back. It'll also keep us away from that weather that's moving in from the west. The instrument departure is the same, fly to the 2 DME, then turn north to intercept the 340° radial at 7 DME. What do ya say?"

"Call tower," directs the AC.

The destruction of any aircraft is a major financial loss for any operator of flying machines. Fortunately, in many cases, the aircraft can be replaced. The destruction of an aircrew, however, is an irreversible tragedy. In this mishap, Captain Matt Dillon was a 34-year old instructor pilot and Pat Garrett was a 20-year old airman, but we know they're more than that. They, along with the rest of the crew, are real people—the kind you meet every day. What sort of people? They're like that guy who bought your dinner after you lost your wallet in Sandbox, North Africa, or the guy who taught you to play the card game, "Montana Red Dog." They're like your son's little league coach, or the airman who showed up at the base hospital with an arm full of AB negative blood when your wife had emergency surgery. They're like your first instructor pilot, your worst enemy, your best friend. None of them can be replaced.

This crew was set up, right? The winds were calm and out of the west—they had been that way all day. First gust—we know it's coming. And that landing gear—it'll hang up again. More than likely that number 1 engine is going to flame out just to prove it had a clogged oil line instead of a bad pressure transmitter. And the wind shear—can you imagine how much trouble that's going to cause when the other problems start to pile up? Then there's the weather. Compound emergencies make entering a 100-foot overcast a little tricky. All in all, it does look like a set up. Too bad, because this crew seemed like a pretty professional bunch of people. Too professional to make that one mistake which could prove disastrous. Let's go back and see.

"Tower, MAC 099."

"Go ahead 099."

"Ask him for the winds," requested Captain Dillon.

"He just said winds are calm," stated the copilot.

"Look at those trees across the runway," added the flight engineer.

"And those clouds up there," said the nav pointing his fingers upward and adjusting the radar's tilt.

"Say your winds please," the copilot of MAC 099 called the tower once more.

"Winds are 260° at 18 knots gusting to 30. Standby MAC 099," directed the tower. "We've got a new met watch coming out. Numerous thunderstorms in vicinity of airfield. Wind gusts in excess of 40 knots, heavy precipitation, possibility of hail, probability of lightning condition—100 percent. Valid until 1400Z. Say your intentions."

Captain Matthew Dillon took the radio call. "We're returning to parking," explained the AC.

"Nav, pilot, call the command post and tell them we're on a weather hold."

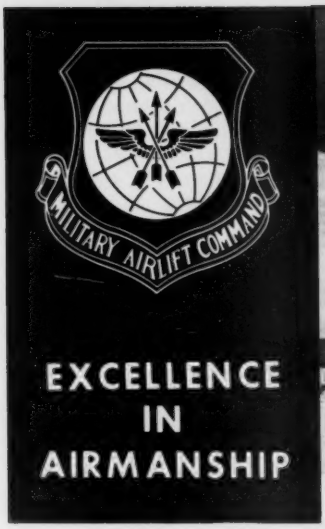
"Sure hope the motor pool's got a crew bus fixed by now. It looks like we might have a little rain before we get this Herk back to its stall," estimated the copilot.

"Just tell them you need transportation for the colonel. That ought to get them moving," emphasized the AC.

"Roger that," intoned Lieutenant Hardy. "The bus is as good as here."

ABOUT THE AUTHOR

A native of Texas, Capt Brewton graduated from the University of Houston in 1970 and completed OTS the same year. After finishing helicopter training in 1971, he was assigned to Thailand and HH-43s. Next came tours in UH-1Fs and HH-1Hs at Little Rock. In 1976, he took advantage of Palace Furlough and worked as an offshore helicopter pilot and electrician. After returning to active duty in 1979, he was assigned to Detachment 2, 67th ARRS at Ramstein. An IP with over 2,000 hours of light-lift time, Capt Brewton is a previous Honorable Mention winner in the 1976 and 1979 writing contests, and won first place in the 1980 contest.



Standing left to right: Capt Arthur M. Speckles, CP; Major Kenneth W. Shedd, FEN; Capt Alan P. Erickson, AC. Kneeling left to right: TSgt Arthur C. Beaulieu, FELM and MSgt Thomas W. Gunnels, FEFE.

Captain Erickson and crew, 50th TAS. While on a phase I overwater navigation training mission 100 miles north of New Orleans, the C-130 number 2 engine generator-out light illuminated with no indication of frequency, voltage or load. The generator was reset but the condition persisted. The Hercules crew quickly shut down the errant number 2 engine. Declaring an emergency, the aircrew began their return to home station.

About 35 miles out of Little Rock the aircraft began to yaw left while descending through 11,000 feet MSL. The number 1 engine RPM suddenly dropped and began fluctuating between 30 and 35 percent RPM regardless of throttle position. Captain Alan P. Erickson and crew then performed an engine shutdown on this engine as well.

At this point the crew was beginning to suspect it was going to be one of "those" days. With two engines shutdown on the same side the C-130 crew completed a manual gear extension at 6,000 feet MSL 18 miles out from the "home drome." An uneventful two-engine approach was flown to touchdown. After placing the nose gear down on the runway during the ground roll, the number 3 and 4 throttles were placed in ground idle. At this point the aircraft began to veer to the right. Using emergency brakes favoring the left brake, with nose wheel steering and antiskid inoperative, the pilots successfully brought the aircraft to a safe stop.

The C-130 aircrew in this emergency properly analyzed each engine malfunction and took the appropriate corrective actions. The resulting loss of the utility hydraulic system compounded their difficulties while landing at Little Rock AFB, Arkansas. Thanks to superior airmanship and crew coordination, Captain Erickson and his crew overcame an extremely dangerous multiple engine-out emergency and safely recovered the crippled Hercules. We proudly salute their excellence in airmanship.

C.R. TERROR

The Field-Grade Flyboy takes "afence" at Decimomannu.

Good morning Major Terror. It's 0330 and you're alerted for your trip to Decimomannu, Sardinia, sir." The young duty officer on the other end of the phone sounded almost too chipper, especially for such an early hour. C.R., on the other hand, was like a bear rudely awakened out of his mid-winter slumber.

"Thanks a lot, my good man. But next time, try to ring a little more softly. My delicate ears, you know."

"I beg your pardon, sir?" apologized the young lieutenant.

"Never mind, never mind. I'll be there shortly." MAC's Most Senior Major unlovingly placed the receiver near the phone cradle and then stumbled into the bathroom of his "rote" apartment. The fire-engine red and shocking pink walls fit right in with C.R.'s definition of "beautiful." He had looked high and low for this place—the standard "Q" was not up to his own high standards—and its near vicinity to the "Bird in the Bush" was a definite plus. After a 45-minute battle with the mirror on the wall, C.R., convinced he had won, wandered out to his "rote" car—a somewhat less than vintage XKE much like the one he owned at home.

"Let's go sweety. Gotta go to the sunny isle of Sardinia, today," he whispered into a make-believe ear of the dark-green rolling wreck. A short time later, the Airlift Lothario was roaring down a small country lane, inadvertently driving on the "wrong" side of the road when an English Mini nearly forced his "Jag" into a drainage ditch.

"Crimenently!" he exclaimed with all the alarm he could muster for so early an hour. "Doggone foreigners. Don't they know what side of the road to drive on?" He then sheepishly crept back to the correct side of the road and sank down below the top of the convertible's door. Well I certainly hope he learned *his* lesson, C.R. thought to himself as he and his "E-type" roared into the Moldenhill base ops parking lot.

The Ace of TAC Airlift sauntered into base ops with his usual aplomb only to be met at the front door by the launch officer of the morning, his nemesis, Lieutenant Colonel "King" Foraday.

"Glad to see you're only 20 minutes late today, Major Terror. What's your 'reason' this time?" he asked with all the sarcasm he could muster.

"Why I was very nearly forced off the road by some little overgrown bug. You know, one of those English Mini's," he decried feigning innocence of all wrong-doing.

"I don't want to hear the rest of it. Luckily your crew has finished flight planning and are waiting for you at the plane. Just sign here."

Colonel Foraday thrust the neatly penned DD Form 1801 into C.R.'s face and the Pudgy Pilot promptly scrawled his usual illegible nom de plume in the wrong block. Then Colonel Foraday added, "You know, C.R., that crew of yours does a pretty good job when you're not around. Maybe you should leave them alone more often. That way you might stay out of trouble."

"Right you are, colonel. Why I was just telling Colonel Fang the other day—" The Silver-Tongued Fox was cut off in mid-boast by the thorough launch officer.

"Not now, C.R. You've got a plane to catch." And with that, both field-graders bounded for the door and to the awaiting step-van. As usual, there was a line of vehicles queued up, and waiting to cross the active runway. This was the time of morning that most aircraft took off from the Suffolk base and if *one* was so unlucky as to be on the "wrong" side of the runway, there was often a long wait before *one* could cross. This delay coupled with C.R.'s tardiness set the launch officer on fire. When they finally arrived at the borwn-and-green Herk, Colonel Foraday gave the Magnificent Major his "marching orders."

"Major Terror," he began, "you have single-handedly been responsible for 14 late takeoffs in 14 departures on this rote. If you don't make this an 'on-time,' I'm going to personally see to it they make you the linen control officer at Dhahran. Understand?"

"Yesssss *Sir*," replied the Frightened Flyboy in such a burst of military courtesy it positively shocked the launch officer. In one continuous flurry of hands, arms, feet and legs, C.R. picked up his bags, raced out the door of the step-van, and picked himself up after tripping over the power cart cable, then lunged up the stairs of the C-130. When his momentum finally stopped, he had miraculously ended up in the left seat surrounded by his bags and pubs.

"Good morning, Sir," greeted C.R.'s flight engineer, Master Sergeant Max Torque. "Here's the TOLD card."

C.R., his eyes full of the impending horror of another

imminent late takeoff literally screamed.

"TOLD card? You must be joking. Let's get this beast started." The Master Manipulator started calling for every checklist he could think of to get the C-130 cranked up. "Starting engines checklist, crew report, get the clearance, clear number 3 engine." With that, he deftly pushed the number-three-engine start button and moved the engine condition lever to "run." And except for one small detail the engine would have started. About that time, Sergeant Torque leaned over and tapped his "alpha charlie" on the right shoulder.

"Uh, excuse me, sir," he asked politely and unhurriedly. " Would you like me to start the GTC now or after you remove your hand from the starter button?" A red glow slowly coloring his face, C.R. sheepishly placed all buttons and levers in their prestart positions and meekly called for the "before-starting-engines checklist." Sammy, the copilot, Blinky, plus Sergeant Ty Downs, in the cargo compartment did an admirable job "assisting" C.R. in getting the Hercules down to the end of the runway.

"Well, it looks as though we're going to make an on time takeoff after all," the Rhinestone Flyboy remarked in an offhanded tone. "Now's a good time to check my oxygen mask and helmet." With that, he reached down to pick up the "brain bucket" only to grab a handful of air. "By the way has anyone seen my oxygen mask and helmet?" he asked.

"Sir, command post is calling," replied Sam. "Seems they found your helmet in the van. Colonel Foraday is on his way to give it to you right now."

"Give it to me is right," said C.R. with a sigh of resignation.

After a terse transfer, the Capable Quintet managed to get off with 30 seconds to spare. With the aid of a favorable tailwind, the crew made it down to the Mediterranean island and were offloaded one-half hour ahead of their fragged time.

"Well Boss," remarked Sammy as they walked toward base ops, "with any luck we'll be back to Moldenhill an hour ahead of schedule."

"Good job crew," replied the Field-grade Fumbler. "Maybe Colonel Foraday will overlook my slight case of forgetfulness if I can get this tub back and ready for another mission ahead of time. But I wouldn't count on it. By the way, what high priority cargo were we carrying for the fighter guys down here?"

"We had a load of 'Stars and Stripes," replied the loadmaster. "Seems the fighter jocks here have been TDY so long they din't even know who won 'Super Bowl XVI.'"

With that, the crew climbed aboard their brown-and-green airlifter and started engines, much more smoothly than before.

"Ask the tower which runway

is active, Sammy, m'lad," ordered C.R.

"Deci tower, Old 13 taxi. And say active runway."

"Roger Old 13. You're cleared to taxi to either runway. You're the only one here. You can do anything you want, over."

Sammy cast a suspicious look at his mentor, afraid of what those last ominous words might have meant to his boss. C.R. too had taken the cart blanche clearance the wrong way, as usual.

"Well, crew," the Ace of Aerospace replied, "I reckon it's time we showed the fighter guys just what this 'vintage' Herk will really do. Stand-by for a max effort takeoff—Terrorific style."

Sammy tried to dissuade his AC. "Boss, I don't think they meant for us to do an airshow - type takeoff."

"Nonsense, m'lad. Why that's exactly what they want us to do," C.R. rebuffed. "It's just their way of telling us without violating radio procedures." Sammy thought about other meanings of the word "violating."

As the lightweight C-130 approached the end of the active runway, C.R. told Sammy to get their takeoff clearance.

"Old 13 ready for takeoff."

"Roger Old 13. Cleared for takeoff. Bon journo."

"Ar-reeva darchie, Deci," replied C.R. "Line-up checklist. Here we go, go, go."

Just as Sammy was about to call line-up checks complete, C.R. jammed the throttles as far forward as they would go and yelled, "Giddap, hoss." His pudgy boots fell off the brakes and the Herk leaped down the runway, the four Hamilton-Standards biting into the thick Italian air. At that moment, the Master Manipulator pulled back on the yoke and the lightweight Herk leaped into the air. Just as suddenly, though, C.R. pushed *forward* on the controls to level the C-130 a scant foot or two off the tarmac.

"Gear up! Flaps up! Warp factor 9 Mister Solo." The Star-struck Skipper issued his flashy commands one upon the other in rapid succession. And as the flaps retracted, the brown-and-green plane accelerated with all

the power the four Allison's could generate. As the screaming "Lockheed Legend" reached the end of the runway, the airspeed had reached something in excess of 250 knots. But nobody noticed. All those on the flight deck (who still had their eyes open) were mesmerized with the on-rushing fence which marked the end of the field boundary. Sammy and Sergeant Torque squinted through the cracks of their fingers covering their eyes as C.R. threw the yoke of the Herk into a hard right turn. They could only guess that the Herky Honcho was going to attempt a "whiffer-dill" maneuver—a right, climbing turn—to put them on course at their assigned altitude. Instead of climbing after entering the bank, however, C.R. pushed on the yoke maintaining a growing relationship with the ground.

"Get this thing up!" yelled Sam at the top of his lungs. "Our wingtip is going to take out that fence!"

"Never fear, m'lad," soothed the Paunchus Pilot. "We're not going to..." At that moment, a sound like a plucked violin string reverberated through the cockpit as C.R. finally pulled back on the yoke. Unlike the careful "controlled" climb he had planned, the Hercules rocketed into the blue like a shot out of a cannon trailing something that looked like a couple of strings of spaghetti.

"Old 13, Deci tower. That was very nice. *Very* nice! But you took the fence with you. Are you okay?" The Italian controller was polite but concerned. By this time, C.R., with Sam's assistance, had leveled the Herk on a high downwind.

"Pilot load. Sir, we have something on our right wing tip that looks like barbed wire."

"Roger that, load. The fence we took out was probably intruding into the cleared-out approach path in direct violation of TERPS standards. I'll have to write a hazard report on it as soon as we land," C.R. informed his conscientious crew. "But first, let's do a controllability check. Tell the tower we'll be declaring an emergency and coming back around for a landing, would ya Sammy m'lad? By the way," he added as a final thought entered his fickle faculties. "Ask them where the nearest store is. I had almost forgotten about my Sardinia sardines."

Sammy sighed, looked back at the engineer and shrugged his shoulders. "Yes Boss. I'll ask them—just as soon as we land."

QUICK STOPPERS

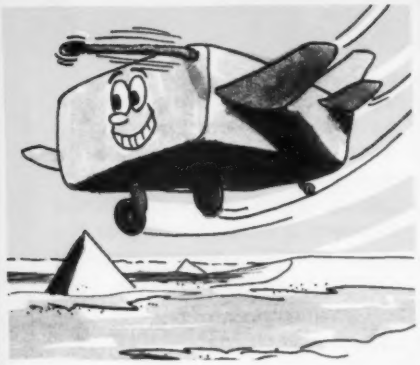
Fire in the Bay

The Starlifter scanner was conducting a walkaround inspection shortly after takeoff. Approaching the right aft underdeck area, the scanner smelled a strange odor and saw flashing in the right avionics bay. Grabbing an A-20 fire bottle, the scanner discharged the agent. At this point the crew started an immediate return to the departure base. Shortly thereafter more flames appeared in the forward center underdeck area of the Starlifter and the scanner used a second fire bottle to extinguish these flames. The crew made a safe landing with no further indications of fire.

Quality control folks found a charred paper towel but no wiring or burn damage. Suspected cause of this accident was arcing from electronic components coming into contact with the misplaced paper towel. Inflight fires can start from many sources and combinations of combustibles. Be prepared!

Dump that Gas

During climbout the Herk flight engineer noticed number 1 fuel tank was about 2,000 pounds lower than normal. Meanwhile, the dropsonde operator in the back of the WC-130E reported fuel coming out of the right and left-hand dump masts. The flight engineer then selected main-tank-to-engine on his fuel panel but it had no effect. The dump switches were checked in the off position and even recycled to the off position but with no effect. After landing, fuel continued to come from the dump mast. The crew taxied clear of the active and then evacuated the aircraft. It seems the main-tank dump valve had stuck partially open on this sortie. When the aircraft took off, the touchdown switch opened the dump-mast valves. This caused the JP-4 to be vented out the left and right dump masts.



One Brick Landing

Flying in the desert lands of the Middle East is often a wee bit "different" than what most of us are used to. And accompanying the flying and its associated idiosyncrasies in "the desert," air-to-ground communications in this exotic land can also be a bit out of the ordinary as the following narrative illustrates. On takeoff roll, a pilot lost one of his engine-driven generators. No sweat, he thought to himself. The mission is a milk-run and only 1 hour in length. Twenty-five minutes later—you guessed it—the other generator gave up the ghost, followed a couple minutes later by the battery. A resourceful fellow indeed, this aviator par excellence pulled out his trusty "brick" hand-held radio and promptly picked up where the aircraft radios left off. No kidding! He established communication with a ground control station which assisted in getting and relaying clearances for him to return to base in VFR conditions. Uneventfully completing a manual gear extension and no-flap landing, the aircraft was released for flight after a faulty voltage regulator and generator were changed.

"Pull Up, Pull Up"

A Boeing 747 commercial airliner was cleared for a straight-in approach in misty conditions. The crew finally spotted the runway and made an attempt to get down. About the time the crew decided they were going to be unable to make a safe landing and began a "go-around," the ground proximity warning system was also activated. The crew executed their go-around and came back around for an uneventful landing. The flight recorder readout indicated the ground proximity warning was genuine. At the time of the warning the aircraft had a 2,500 feet-per-minute descent rate while only 871 feet above the ground. The pilot in this situation did not fly the 3° glide slope but maintained altitude until late in the approach. There was also a tail wind which went undetected during the early phases of the approach. In attempting to get down, the pilot's descent rate triggered the GPWS. The crew in this incident made the right decision to go-around. Attempting to salvage this approach could have ended in a disaster.

—British Airways *Air Safety Review*

Qs

Sand-Lot Landing

A CH-3E departed an east-coast base enroute to the space shuttle landing strip at Kennedy Space Center, Florida. Fifteen minutes after takeoff a chip light for the intermediate gear box illuminated. The crew decided to make a precautionary landing and found a large vacant lot which would serve as an emergency heliport.

After a safe landing, maintenance troops examined the gear box and discovered metal slivers and metallic fuzz on the intermediate gear-box plug. During a 30-minute serviceability check the chip light came on again so it was "remove and replace" for the gear box. Precautionary landings are a constant possibility for helicopter flyers. Keeping a watchful eye for potential landing sites, as this crew did, could spell the difference between a safe recovery and a "bent aircraft"—especially when the chips are down.

Notable Quote

"The dictionary is the only place where success comes before work."

—Anonymous

AFTER DEADLINES

SUBMITTED ANY MDRs RECENTLY? Especially you CT-39 types? Well if you've experienced an engine shutdown and were told it was due to a "failed pressure relief valve" or a "faulty transmitter" and you let it go at that, well maybe you didn't go far enough. Did maintenance submit a MDR on a cracked relief valve? If not, how do you know it didn't fail from either fatigue corrosion or overtorquing? Well, according to Sacramento ALC, of the last 40 Class C flight mishaps (4 years worth) involving inflight engine shutdowns, very few generated enough interest to get a MDR turned in. Ernie Smith at Sacramento ALC asks if you do have a Class C mishap which involves material failure or suspected failure, submit a report, hold the item as an exhibit and consult your 00-35D-54. If you have any further questions concerning MDRs, call Mr. Smith at autovon 633-5757. Information courtesy SM-ALC/MMSR.

C-5 WILL FLY 100 YEARS, or at least its wing will. Lockheed-Georgia Company at Marietta, Georgia has been authorized to "fly" the completely redesigned Galaxy wing to 105,000 hours in the fatigue/crack propagation tests now in progress at the Marietta plant. Identical in design to the wings which will replace the current wings on MAC's fleet of C-5s, the fatigue/test article will have reached 90,000 hours of test "flying" before the end of April 1982 with an additional 15,000 hours to go until it reaches 105,000 hours of testing--the equivalent of 100 years of flying. Information courtesy Lockheed Public Information Office.

LAST "SHORT" C-141, 63-8076, has arrived at Lockheed-Georgia's Marietta plant to have itself "stretched." The 438th MAW A-model arrived at the plant on 5 April and entered the stretching facilities on 19 April. When it rolls off the line sometime in June 1982, it will have the honor of being the last of 270 MAC C-141s that have been "stretched."

THANKS TO UPI for their news article used in the April 82 TMF Flying Circus feature, subtitled "FOD for Thought."

NEXT MONTH'S ISSUE of TMF will include: "Changes in the Wind," an article about the new Optimized MAC Computer Flight Plan due to be available in July to MAC flyers; "The Nightingale Shuttle" which will feature a C-9 aeromedical evacuation flight in Europe; and "Don't Get Rolled" which discusses dynamic rollover in helicopters and how to avoid this pilot-induced hazard.

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The CAT and DUCK METHOD of INSTRUMENT FLIGHT

1. Place a live cat on the cockpit floor; because a cat always remains upright, he or she can be used in lieu of a needle and ball. Merely watch to see which way the cat leans to determine if a wing is low, and if so, which one.

2. The duck is used for the instrument approach and landing. Because of the fact that any sensible duck will refuse to fly under instrument conditions, it is only necessary to hurl your duck out of the plane and follow it to the ground.

Limitations to the Cat and Duck Method

1. Get a wide-awake cat. Most cats do not want to stand up at all. It may be necessary to carry a large dog in the cockpit to keep the cat at attention.

2. Make sure your cat is clean. Dirty cats will spend all their time washing. Trying to follow a washing cat usually results in a tight snap roll followed by an inverted spin (flat).

3. Use old cats only. Young cats have nine lives, but old, used-up cats with only one life left have just as much to lose as you do and will be more dependable.

4. Beware of cowardly ducks. If the duck discovers that you are using the cat to stay upright, she will refuse to leave without the cat. Ducks are no better in IFR conditions than you are.

5. Be sure that the duck has good eyesight. Near-sighted ducks sometimes fail to recognize that they are on the gauges and go flogging off into the nearest hill. *Very* near-sighted ducks will not realize they have been thrown out and will descend to the ground in a sitting position. This maneuver is difficult to follow in an airplane.

6. Use land-loving ducks. It is very discouraging to break out and find yourself on final for a rice paddy, particularly if there are duck hunters around. Duck hunters suffer from temporary insanity while sitting in freezing weather in the blinds and will shoot at anything that flies.

7. Choose your duck carefully. It is easy to confuse ducks with geese because many water birds look alike. While they are very competent instrument flyers, geese seldom want to go in the same direction as you. If your duck heads off for Canada or Mexico, you may be sure that you have been given the goose.

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